Charging and Discharging of Capacitors with Two Voltage Steps

PhyPiDAQ
Digital Measurement System Based on
Raspberry Pi

Objectives:

- Build electric circuits with various resistors and capacitors connected to the Raspberry Pi in order to visualise, record and analyse the charging and discharging process of capacitors;
- Measure the voltage across the capacitor and the charging and discharging current in the RC-circuit by using the Analog-to-Digital Converter ADS1115;
- Use the PhyPiDAQ-Software to display specific quantities such as the voltage across the capacitor or the stored charge in real-time and in various graphical form;
- Employ spreadsheets like LibreOffice or Excel to process the measurements stored in .csv files to derive the time constant of a RC circuit;
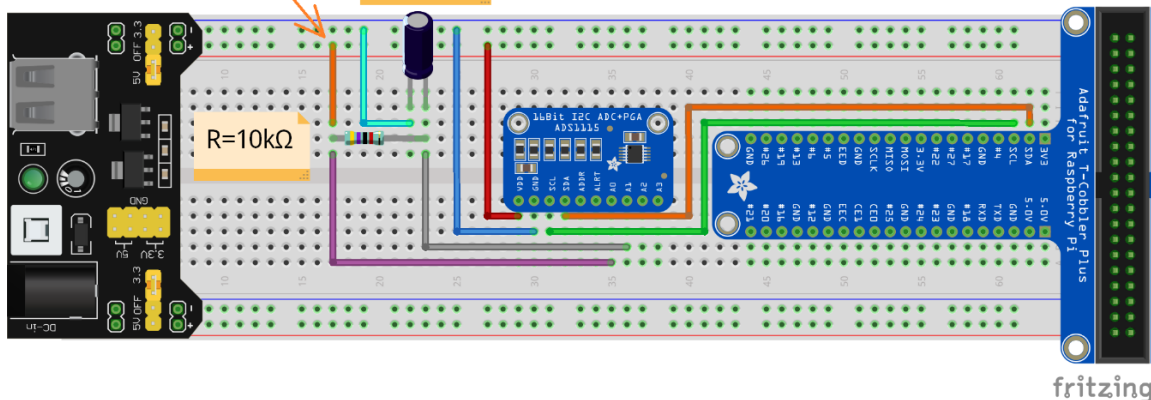
Charging and discharging of the capacitor by moving the free red wire between the +3,3V pin of the Raspberry Pi and the ground. The voltage across the capacitor is recorded at the A1 channel of the ADS1115 Analog-to digital convertor. The charging/discharging current is calculated by means of the Ohm's law based on the voltage between the A0 and A1 channels.

Procedure:

-On the Graphical Interface of the PhyPiDAQ Software one has to configure the experiment according to the `Kondensator_I_Q.daq`
−The Analog-to-digital convertor has to be configured according to the `ADS1115Config.yaml.`

Measurements:

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